Isaac Lowthian Bell, F.C.S.	John Eliot Howard, F.L.S.
W. T. Blanford, F.G.S.	Sir Henry Sumner Maine, LL.D.
Henry Bowman Brady, F.L.S.	Edmund James Mills, D.Sc.
Thomas Lauder Brunton, M.D., Sc.D.	Rev. Stephen Joseph Perry, F.R.A.S.
Prof. W. Kingdon Clifford, M.A.	Henry Wyldbore Rumsey, M.D.
Augustus Wollaston Franks, M.A.	Alfred R. C. Selwyn, F.G.S.
Prof. Olaus Henrici, Ph.D.	Charles William Wilson, Major R.E.
Prescott G. Hewett, F.R.C.S.	

Thanks were given to the Scrutators.

June 11, 1874.

JOSEPH DALTON HOOKER, C.B., President, in the Chair.

Mr. William Thomas Blanford, Dr. Thomas Lauder Brunton, Professor W. Kingdon Clifford, Mr. Prescott G. Hewett, Mr. John Eliot Howard, Dr. Edmund James Mills, the Rev. Stephen Joseph Perry, and Major Charles William Wilson were admitted into the Society.

The Presents received were laid on the table, and thanks ordered for them.

The following Papers were read :—

I. "Note on the Absorption-Spectra of Potassium and Sodium at low Temperatures." By H. E. Roscoe, F.R.S., and Arthur Schuster, Ph.D. Received April 30, 1874.

In order to obtain the absorption-spectrum afforded by the well-known green-coloured potassium vapour, pieces of the clean dry metal were sealed up in glass tubes filled with hydrogen, and one of these was then placed in front of the slit of a large Steinheil's spectroscope furnished with two prisms having refracting angles of 45° and 60°. The magnifying-power of the telescope was 40, and was sufficient clearly to separate the D lines with one prism. A continuous spectrum from a lime-light was used, and that portion of a tube containing the bright metallic globule of potassium was gently heated until the green vapour made its appearance. A complicated absorption-spectrum was then seen, a set of bands (α) in the red coming out first; whilst after a few moments two other groups appeared on either side of the D lines, the group β (less refrangible) being not so dark as the group γ. These bands are all shaded off towards the red, and in general appearance resemble those of the iodine-spectrum. In order to assure ourselves that the bands are not caused by the presence of a trace of an oxide, tubes were prepared in

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which the metal was melted in hydrogen several times on successive days until no further change in the bright character of the globule could be perceived. On vaporizing the metal, which had been melted down to a clean portion of the tube, the bands were seen as before, and came out even more clearly, the globule, after heating, exhibiting a bright metallic surface. An analysis of the potassium used showed that it did not contain more than 0·8 per cent. of sodium, although, of course, the double line D was always plainly seen.

In order to ascertain whether an alteration in the absorption-spectrum of the metal takes place at a red heat, fragments of potassium were placed in a red-hot iron tube, through which a rapid current of pure hydrogen gas was passed, the ends of the tube being closed by glass plates. The magnificent green colour of the vapour was clearly seen at this temperature, on looking through the tube at a lime-light placed at the other end. Owing, doubtless, to the greater thickness or increased pressure of the vapour, the bands seen by the previous method could not be resolved by the small spectroscope employed, the whole of the red being absorbed, whilst a broad absorption-band in the greenish yellow was seen occupying the place of the group γ.

The positions of the bands obtained by the first method were measured by means of a telescope and distant scale, and the wave-lengths obtained by an interpolation curve, for which well known air-lines were taken as references. The following numbers give the wave-lengths of the most distinct, that is, the most refrangible edge of each band. As the measurements had to be made quickly, owing to the rapid darkening of the glass by the action of the metallic vapour, these numbers do not lay claim to very great accuracy, but fairly represent the relative positions of the band, and show that they do not always occur at regular intervals, although they are pretty regularly spread over the field and all are shaded alike.

Bands of potassium shaded off towards red. Wave-lengths in tenth-metres :—

6844	α	6459	α	6311	α	5949	β	5763	γ
6762		6430		6300		5930		5745	
6710		6400		6275		5901		5732	
6666		6379		6059	β	5860	γ	5712	
6615		6357		6033		5842		5700	
6572		6350		6012		5821		5690	
6534		6331		5988		5802		5674	
6494		6322		5964		5781		5667	

The bright potassium-lines in the red and violet were not seen reversed, the intensity of the lime-light being too small at both extremes to render an observation possible.

In order to ascertain whether the vapour of sodium, which, when seen in thin layers, appears nearly colourless, exhibits similar absorption-bands, tubes containing the pure metal, which had been manufactured and preserved out of contact with any hydrocarbon, were prepared, the metal being obtained free from oxide and the absorption-spectrum being observed in the manner already described. As soon as the metal began to boil, a series of bands in the blue (Na γ) made their appearance, and shortly afterwards bands in the red and yellow (Na α), stretching as far as the D lines, came out. At this period of the experiment the D lines widened, thus blotting out a series of fine bands occurring in the orange (Na β), some of which, consequenly, could not be mapped. All the bands of the sodium-spectrum shade off, like the potassium-bands, towards the red.

When the vapour of sodium is examined in a red-hot iron tube, the colour of the lime-light, as seen through it, is a dark blue. As the sodium is swept away by the current of hydrogen passing through, the colour becomes lighter, and the transmitted rays can be analyzed by the spectroscope. At first, the whole red and green and part of the blue is cut out entirely. The D lines are considerably widened, and an absorption-band is seen in the green, apparently coinciding with the double sodium-line, which comes next in strength to the D lines. All the colours, therefore, seem to be shut out, except part of the orange, part of the green, and the ultra-blue. As the sodium-vapour becomes less dense, more light passes through, and the same absorption-bands are seen as are observed in the other method. The vapour then has a slight bluish-green tint, but is nearly colourless.

The following numbers give the wave-lengths of the more refrangible edge of the sodium absorption-bands in tenth-metres, obtained in the manner above described:—

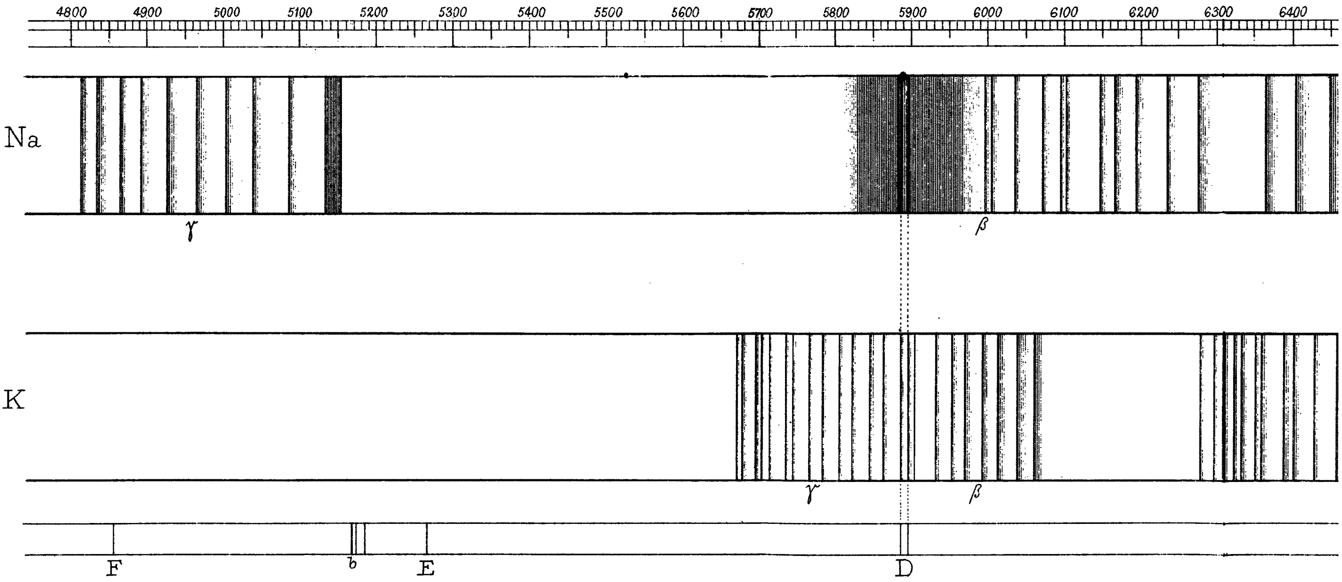
6668		6361		6105		5999	β	4964	
6616		6272		6092		5150		4927	
6552		6235		6071		5129		4889	
6499	α	6192	α	6051	β	5082	γ	4863	γ
6450		6162		6035		5038		4832	
6405		6149		6016		5002		4810	

Plate IV. shows the general appearance of the two absorption-spectra.

II. "Note on the alleged Existence of Remains of a Lemming in Cave-deposits of England." By Professor Owen, C.B., F.R.S. Received April 25, 1874.

In the "Report on the Exploration of Brixham Cave" (Phil. Trans. 1873) it is stated (p. 560):—"With the appearance in the cave of the smaller common rodents now living in this country, we have to note a remarkable exception, that of the Lemming (*Lagomys spelæus*)." And again, in the list of animal remains as determined by Dr. Falconer and by

Roscoe & Schuster



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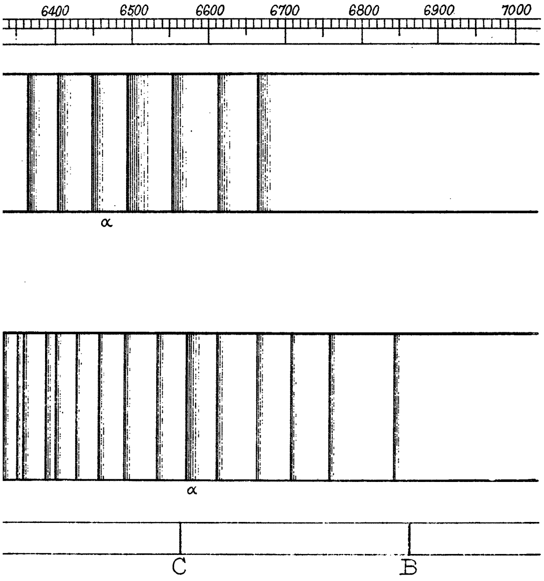

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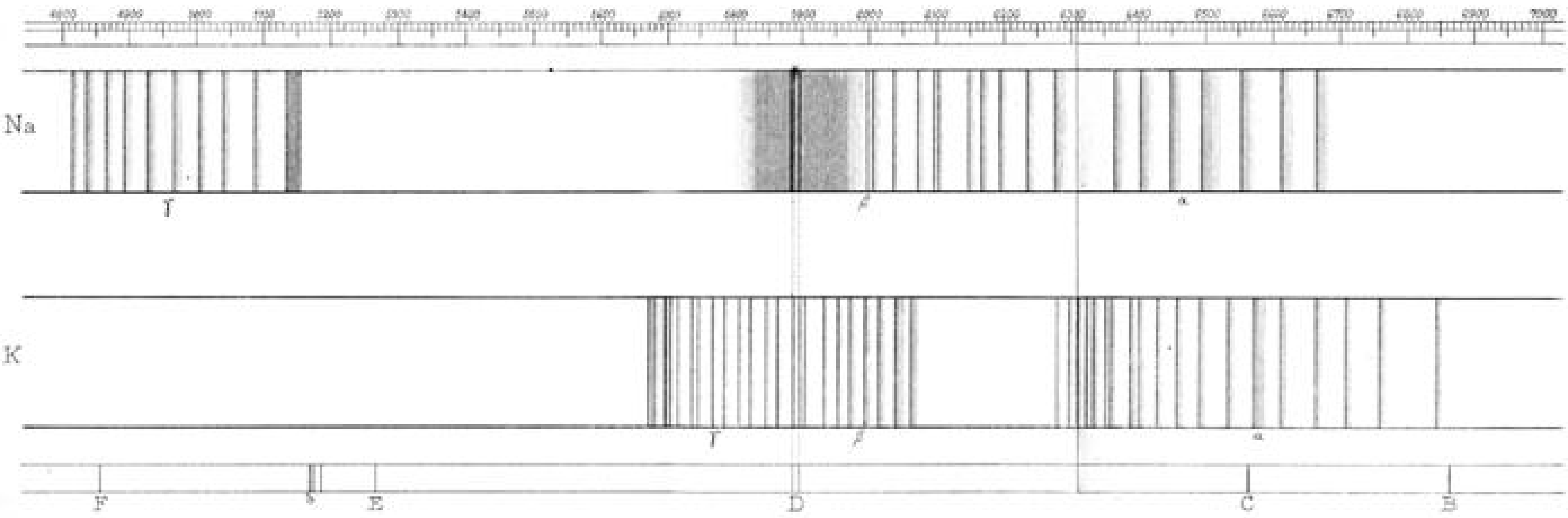

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